What is claimed is:

1. A method for cleaning a surface of a conductive layer on a semiconductor substrate placed in a reaction chamber,

wherein plasma containing hydrogen is generated in the reaction chamber, and the surface of the conductive layer is cleaned by being reduced therewith.

2. The method of claim 1, wherein residual organic material on the surface of the conductive layer is ashed by the plasma.

3. The method of claim 1 or 2, wherein an insulating layer is formed on the surface of the conductive layer, a via hole for exposing a part of the conductive layer is formed in the insulating layer, and the surface of the conductive layer exposed through a bottom portion of the via hole is cleaned by the plasma.

4. The method of claim 3, wherein an upper insulating film is further formed on the insulating layer, and a wiring trench for exposing the via hole is formed in the upper insulating film, the exposed surface of the conductive layer being cleaned by the plasma after the upper insulating film has been formed.

5. The method of claim 1, wherein the above-mentioned steps of cleaning is performed using a high density plasma processing at a low electron temperature.

6. The method of claim 5, wherein the high density plasma processing is performed by forming a uniform electric field in the reaction chamber, the high density plasma being generated using microwave.

7. The method of claim 6, wherein the high density plasma processing is performed under an atmosphere of gaseous mixture containing hydrogen and helium, and ratio of the helium with respect to the hydrogen is set to be 0.005 to 20.

8. The method of claim 1, wherein the plasma containing the hydrogen further contains Ar gas.

9. The method of claim 1, wherein the plasma containing the hydrogen further contains Ar gas and He gas.

10. The method of claim 1, wherein the plasma containing the hydrogen further contains He gas.

11. The method of claim 1, wherein a density of the plasma is $10^{10}$ to $10^{13}$ $cm^3$.

12. The method of claim 1, wherein an electron temperature of the plasma is 0.7 to 3 eV.

13. The method of claim 6, wherein the plasma is generated by using a planar antenna.

14. The method of claim 5, wherein the plasma is inductively coupled plasma or magnetron plasma.

15. A storage medium storing a software for performing a cleaning method for cleaning a surface of a conductive layer on a semiconductor substrate in a reaction chamber, the cleaning method comprising the steps of:

generating plasma containing hydrogen in the reaction chamber; and

cleaning the surface of the conductive layer by reducing the surface of the conductive layer.

16. The storage medium of claim 15, wherein a residual organic material on the surface of the conductive layer is ashed by the plasma.

17. The storage medium of claim 15 or 16, wherein an insulating layer is formed on the substrate of the conductive layer, a via hole for exposing a part of the conductive layer is formed in the insulating layer, and the

surface of the conductive layer exposed through a bottom portion of the via hole is cleaned using the plasma.

18. The storage medium of claim 17, wherein an upper insulating film is further deposited on the insulating layer, and a wiring trench for exposing the via hole is formed in the upper insulating film, the exposed surface of the conductive layer being cleaned using the plasma after the upper insulating film has been formed.

19. The storage medium of claim 15, wherein the above-mentioned steps of cleaning is performed by a high density plasma processing at a low electron temperature.

20. The storage medium of claim 19, wherein the high density plasma processing is performed by forming a uniform electric field in the reaction chamber, the high density plasma being generated using microwave.

21. The storage medium of claim 20, wherein the high density plasma processing is performed under an atmosphere of gaseous mixture containing hydrogen and helium, and ratio of the helium with respect to the hydrogen is set to be 0.005 to 20.